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# Addicted to the Pump

*Shaneka Reese\**

## I. INTRODUCTION

The Detroit Auto Show is the auto industry's opportunity to silence its critics and show why it dominates the market. This year, the Auto Show represents Detroit's and American automakers' best chance to prove the industry can make a comeback.<sup>1</sup> The hope for America's top three automakers is that their new designs can recapture the share of the market they have lost to imports.<sup>2</sup> The importance of this show is best shown in the statements of an auto assembly worker speaking of the significance of the new models' success: "Right now, we need stylish, well-designed, innovative cars that are going to get people excited. If Detroit doesn't build them, someone else will."<sup>3</sup>

Indeed, Japanese automakers are already building these cars and continue to gain more of the market. Industry analysts forecast a slight decline in American auto sales for 2007 and an increase of the market share controlled by foreign automakers.<sup>4</sup>

American automakers look to dazzle at these auto shows. They create cars that have incredible features, cars better suited to fantasy than the real world.<sup>5</sup> While fantasy cars are exciting to see, it is only through realistic innovation that the U.S. auto industry can reinvigorate interest in their products. One way to stimulate innovation is to force American automakers and this country to make changes.

Most of the world has acknowledged a growing problem with greenhouse gas emissions ("GHG"), and has expressed that

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<sup>1</sup> Lawrence Ulrich, *Detroit Puts on a Show and It's Playing for Keeps*, NY TIMES, Jan. 7, 2007, § 12, at 1-2, available at <http://www.nytimes.com/2007/01/07/automobiles/07SHOW.html?ex=1325826000&en=d0311ea2d7cdb5f6&ei=5088&partner=rssnyt&emc=rss>.

<sup>2</sup> *Id.*

<sup>3</sup> *Id.*

<sup>4</sup> *Id.*

<sup>5</sup> *Id.*

acknowledgement by ratifying the Kyoto Protocol (“Kyoto”).<sup>6</sup> The United States, however, has refused to ratify Kyoto.<sup>7</sup> Automobiles are responsible for the largest portion of the global increase in carbon dioxide emissions.<sup>8</sup> As part of the most powerful industry in the world,<sup>9</sup> U.S. automakers are capable of reducing emissions as required by Kyoto. Adopting Kyoto will in fact prove beneficial to American automakers, by forcing them to adjust to the new market condition that has contributed to the ascendancy of foreign automakers—the desire for more fuel-efficient vehicles. As the industry is already moving towards more environmentally friendly cars, ratifying Kyoto would only accelerate a process already underway, while simultaneously stimulating innovation.<sup>10</sup>

This comment will explore how the ratification of the Kyoto Protocol can help U.S. automakers stay competitive. The fundamental idea is that U.S. automakers can exchange their support for and compliance with the Kyoto Protocol, earning the United States considerable diplomatic goodwill, and in turn the government would provide significant financial support to ensure the transition meets the mandates of Kyoto. This in essence will provide the auto industry with the time it needs to recover and compete with foreign automakers. Part II will give a basic introduction on emissions and the Kyoto Protocol. Part III will examine national legislation and programs already in place to control emissions. Part IV will address the United States’s failure to ratify the Kyoto Protocol and how the world has responded. Part V will discuss the advancements in technology being developed and implemented by automakers. Part VI will conclude with a comparison between U.S. automakers and foreign automakers in an effort to show where the market is headed.

## II. EMISSIONS AND THE KYOTO PROTOCOL

The purpose of Kyoto is to reduce the amount of GHG emissions produced by developed countries.<sup>11</sup> To understand the rationale behind Kyoto as well as its structure, it is helpful to examine the nature and effects of emissions. After that, the fundamental tenets of Kyoto will be

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<sup>6</sup> Chester Brown, *The Kyoto Protocol Enters into Force*, ASIL INSIGHT, Feb. 2005, available at <http://www.asil.org/insights/2005/03/insights050301.html>.

<sup>7</sup> *Id.*

<sup>8</sup> Massachusetts Technology Collaborative, *What Are Emissions?*, <http://www.mtpc.org/cleanenergy/important/envemissions.htm> (last visited Apr. 3, 2007) [hereinafter *What are Emissions?*].

<sup>9</sup> Donald O. Mayer, *Corporate Governance in the Cause of Peace: An Environmental Perspective*, 35 VAND. J. TRANSNAT’L L. 585, 609 (2002).

<sup>10</sup> *Id.* at 610.

<sup>11</sup> See Kyoto Protocol to the United Nations Framework Convention on Climate Change art. 2, Dec. 10, 1997, 37 I.L.M. 22 (1998), available at <http://unfccc.int/resource/docs/convkp/kpeng.pdf>.

introduced.

#### A. Emissions

“Emissions” refers to the gases and tiny particles released or emitted into the air as the by-products of natural or man-made processes.<sup>12</sup> One common source of emissions is the burning of fuel to create a form of energy.<sup>13</sup> Global increases in carbon dioxide levels are primarily due to the burning of fossil fuels.<sup>14</sup>

There are four major sources of GHG: burning of fossil fuels for electricity, industrial and commercial use of fossil fuels for heat, burning of fossil fuels in transportation, and emissions from agriculture and miscellaneous activities.<sup>15</sup>

The Intergovernmental Panel on Climate Change (“IPCC”) identified emissions of carbon dioxide as the chief contributor to global warming, concluding also that the burning of fossil fuels is the most significant source of carbon dioxide emissions worldwide.<sup>16</sup> Carbon dioxide is one of the most common gases found in our atmosphere and is regulated by a natural carbon cycle.<sup>17</sup> This cycle consists of carbon dioxide being released into the air and then being absorbed by vegetation and water; however, this process is disrupted by additional emissions from human activity and deforestation.<sup>18</sup> With greater emission of carbon dioxide and less vegetation to absorb it, a substantial portion remains in the atmosphere, warming the earth.<sup>19</sup> The IPCC was developed by the World Meteorological Organization and the United Nations Environmental Programme to assess information relevant to climate change, the impact of climate change, and what measures can be taken to mitigate the damage. Most recently, the 2007 report states that atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased markedly as a result of human activities since 1750.<sup>20</sup> The rise of electricity has contributed a slightly greater percentage of this increase than fossil-fuel

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<sup>12</sup> What are Emissions?, *supra* note 8.

<sup>13</sup> *Id.*

<sup>14</sup> INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, *available at* [http://ipcc-wg1.ucar.edu/wg1/docs/WG1AR4\\_SPM\\_PlenaryApproved.pdf](http://ipcc-wg1.ucar.edu/wg1/docs/WG1AR4_SPM_PlenaryApproved.pdf) (last visited Apr. 3, 2007) [hereinafter CLIMATE CHANGE 2007].

<sup>15</sup> What are Emissions?, *supra* note 8.

<sup>16</sup> Richard L. Ottinger & Mindy Jayne, *Global Climate Change Kyoto Protocol Implementation: Legal Frameworks for Implementing Clean Energy Solutions*, 18 PACE ENVTL. L. REV. 19, 21 (2000).

<sup>17</sup> What are Emissions?, *supra* note 8.

<sup>18</sup> *Id.*

<sup>19</sup> *Id.*

<sup>20</sup> CLIMATE CHANGE 2007, *supra* note 14.

based transportation.<sup>21</sup> However, automakers already have available technology that can significantly reduce this problem, and that same technology, if used in production of new models, could increase American automakers' ability to compete with foreign automakers who are steadily gaining market share. In addition, a change started among automakers could have a domino effect, leading other industries to develop and implement technologies that could further help in reducing emissions.

### B. Kyoto Protocol

In June 1992, Mexico and more than 150 other countries signed the United Nations framework Convention on Climate Change in Rio de Janeiro.<sup>22</sup> The initial framework called for parties to stabilize their GHG emissions at 1990 levels by the year 2000.<sup>23</sup> At this time, none of the commitments were binding.<sup>24</sup> This proved unsuccessful; only a few countries demonstrated both the willingness and the ability to meet the voluntary goals set out in the framework.<sup>25</sup>

In 1997, the countries involved in the framework met in Kyoto, Japan for further negotiations on the treaty.<sup>26</sup> The resulting amendment, now commonly known as the Kyoto Protocol, consists of two sections, called Annex I and Annex B. Annex I lists developed countries and countries undergoing the transition to a market economy.<sup>27</sup> The 36 Annex I countries have pledged to cut their emissions of GHG.<sup>28</sup> Annex B lists the assigned target amounts for GHG emissions reductions that each country in Annex I is obligated to achieve.<sup>29</sup> Members of the Organization for Economic Cooperation and Development ("OECD"); as well as countries of the former Soviet Union and Eastern Europe are listed in Annex I of Kyoto and pledged to cut anthropogenic emissions of the following six greenhouse gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.<sup>30</sup> The deadlines for these cuts were set between the years 2008 to 2012.<sup>31</sup> The OECD represents

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<sup>21</sup> *Id.*

<sup>22</sup> William L. Thomas, *The Kyoto Protocol: History, Facts, Figures, and Projections*, FORTNIGHTLY MAGAZINE, Apr. 15, 1999, available at <http://www.pur.com/pubs/3213.cfm>.

<sup>23</sup> *Id.*

<sup>24</sup> *Id.*

<sup>25</sup> *Id.*

<sup>26</sup> *Id.*

<sup>27</sup> Brown, *supra* note 6.

<sup>28</sup> *Id.*

<sup>29</sup> *Id.*

<sup>30</sup> Thomas, *supra* note 22.

<sup>31</sup> *Id.*

industrialized nations that emit the largest amounts of carbon dioxide.<sup>32</sup> The targets are a percentage of the respective country's individual 1990 emissions level with the view of reducing that level by 5% during the commitment period.<sup>33</sup> Each country had a target reduction percentage: the United States's target was 7% below 1990 levels; Canada's was 6% below.<sup>34</sup> The European Union would be required to reduce its emissions to 8% below 1990 levels and Japan would be required to reduce its by 6%.<sup>35</sup> Twenty-one other industrialized countries would be required to meet similar targets in the same time period and all industrialized nations would be committed to further cuts after that.<sup>36</sup> Overall, the commitments made by industrialized nations in Annex B of Kyoto, which lists national targets, will result in a 5.2% reduction below 1990 levels during the five year time period expressed above.<sup>37</sup>

The Protocol would enter into force when fifty-five states parties who had accounted for a total of 55% of the total carbon dioxide emissions in 1990 had deposited their instruments of ratification, acceptance, approval, or accession.<sup>38</sup> Despite the United States's failure to ratify the Protocol, this condition was met in February 2005. Aside from the United States, Australia is the only notable Annex I state that has not ratified the treaty.<sup>39</sup>

With Kyoto now ratified, the requirements for the nations involved have crystallized. Article 3(1) of Kyoto requires states listed in Annex I of the Framework Convention to limit and reduce their GHG emission levels to their respective assigned amounts specified in Annex B.<sup>40</sup> Without participation by all Annex I states, Kyoto will have minimal environmental effectiveness, as Annex I states are responsible for a disproportionate amount of emissions.<sup>41</sup>

The major feature of the Kyoto Protocol is that Annex I states can meet their obligations jointly rather than singly. This is facilitated by the "flexibility mechanisms" known as the Marrakesh Accords: Article 6 Joint Implementation, Article 12 Clean Development Mechanism, and Article 17

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<sup>32</sup> Ari Bessendorf, *Games in the Hothouse: Theoretical Dimensions in Climate Change*, 28 SUFFOLK TRANSNAT'L L. REV. 325, 330–31 (2005).

<sup>33</sup> United Nations Framework Convention on Climate Change, A Summary of the Kyoto Protocol, [http://unfccc.int/kyoto\\_protocol/background/items/2879.php](http://unfccc.int/kyoto_protocol/background/items/2879.php) (last visited Apr. 3, 2007).

<sup>34</sup> Thomas, *supra* note 22.

<sup>35</sup> Mayer, *supra* note 9, at 612.

<sup>36</sup> *Id.*

<sup>37</sup> Thomas, *supra* note 22.

<sup>38</sup> *Id.*

<sup>39</sup> *Id.*

<sup>40</sup> *Id.*

<sup>41</sup> *See id.*

Emissions Trading.<sup>42</sup> Under Article 6, “Annex I states can supplement domestic actions by engaging in emissions reduction projects in other Annex I states.”<sup>43</sup> By using Article 12, Annex I states can work toward “compliance with their targets by engaging in emissions reduction, afforestation,<sup>44</sup> or reforestation projects in non-Annex I states.”<sup>45</sup> Another option is Article 17, which allows Annex I states to “supplement domestic actions by trading part of their allocated emissions allowances. . . .”<sup>46</sup> Basically, Annex I parties can acquire units from other Annex I parties to be used towards meeting their emissions targets.<sup>47</sup> These units can be transferred when the country does not need to use them to meet compliance with their own targets.<sup>48</sup> By using one of these options, industrialized nations “can earn carbon emission reduction credits to meet their countr[ies]’ . . . obligations.”<sup>49</sup>

While the major feature of Kyoto is the Marrakesh Accords, the principal goals are prescribed in Article 2.<sup>50</sup> This article details the adoption of clean energy solutions for the “enhancement of energy efficiency in relevant sectors of national economies . . . increased use of renewable forms of energy, removal of fiscal incentives and subsidies promoting greenhouse gas emissions, and limitations and reductions of emissions.”<sup>51</sup>

Another matter to address concerning Kyoto is the Common but Differentiated Responsibility Principle (“CBDR”). The CBDR was first described in the Rio Declaration on Environment and Development and was the principle around which the negotiations for which the Kyoto Protocol were premised.<sup>52</sup> According to the CBDR, all countries are responsible for global environmental problems but, generally, industrialized nations are more responsible than others.<sup>53</sup> However, in coming decades, developing

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<sup>42</sup> Brown, *supra* note 6.

<sup>43</sup> *Id.*

<sup>44</sup> To convert (bare or cultivated land) into forest. Dictionary.com, <http://dictionary.reference.com/browse/afforestation> (last visited Apr. 4, 2007).

<sup>45</sup> Brown, *supra* note 6.

<sup>46</sup> *Id.*

<sup>47</sup> United Nations Framework Convention on Climate Change, Emissions Trading, [http://unfccc.int/kyoto\\_protocol/mechanisms/emissions\\_trading/items/2731.php](http://unfccc.int/kyoto_protocol/mechanisms/emissions_trading/items/2731.php) (last visited Apr. 4, 2007).

<sup>48</sup> *Id.*

<sup>49</sup> Ottinger & Jayne, *supra* note 16, at 85.

<sup>50</sup> *See id.* at 21.

<sup>51</sup> *Id.*

<sup>52</sup> *See* Paul G. Harris, *Common but Differentiated Responsibility: The Kyoto Protocol and United States Policy*, 7 N.Y.U. ENVTL. L.J. 27, 29 (1999).

<sup>53</sup> *See id.* at 30.

countries will be the leaders.<sup>54</sup> Following this principle, Kyoto requires developed countries to reduce their aggregate emissions by 5% of their 1990 levels; however, Kyoto does not require developing countries to take on new commitments (commitments beyond the required 5% reduction of 1990 levels) to limit their GHG emissions.<sup>55</sup>

### III. NATIONAL LEGISLATION AND PROGRAMS

Even though the United States did not adopt the Kyoto Protocol, it has adopted several national legislative measures and programs to reduce GHG emissions, most of which dealt with emissions from automobiles.

#### A. 1990 Clean Air Act Amendments

The 1990 Clean Air Act (“CAA”) applies to power plants and vehicle emission standards. The legislation put numerical limits on tailpipe emissions and usually required “annual vehicle inspections for compliance with the standards as a condition of registering the vehicle; catalytic converters to remove pollutants at the tailpipe; and require[d] elimination of lead from gasoline.”<sup>56</sup> The Clean Fuel Vehicle (“CFV”) Program is part of the amendments to the CAA; “[t]he CFV Program forces technolog[ical] advances by requiring clean alternative fuels and by requiring cars to burn their fuels in a cleaner manner. The CFV Program focuses on clean fuel vehicles that meet . . . federal standards . . . or California emission standards . . . .”<sup>57</sup> Regulations like this have forced the automobile industry to work towards “develop[ing] clean fuel vehicles that will meet the federal mandates.”<sup>58</sup>

#### B. National Low-Emission Vehicle Program

The National Low-Emission Vehicle Program was proposed by the Environmental Protection Agency in 1997.<sup>59</sup> “The program requires automakers to produce cars that emit 70% fewer nitrogen oxide emissions and 50% fewer hydrocarbons for sales in [several] northeastern states” in 1999 models and in 2001 models for the rest of the country.<sup>60</sup> When this was introduced, automakers supported the program because it “lower[ed] vehicle cost by avoiding patchwork . . . regulations,” New York, Vermont,

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<sup>54</sup> See *id.* at 31.

<sup>55</sup> See *id.* at 34.

<sup>56</sup> Ottinger & Jayne, *supra* note 16, at 49.

<sup>57</sup> Patricia Heckman, *Automotive Advances in 1998*, 10 COLO. J. INT’L ENVTL. L. & POL’Y 269, 271 (1999).

<sup>58</sup> *Id.*

<sup>59</sup> *Id.*

<sup>60</sup> *Id.* at 271–72.



and Maine rejected the plan for more stringent programs that could include zero emissions vehicles.<sup>61</sup> Advocates for clean air were quick to point out that the program grants a ten year delay in stricter emissions regulations; but regardless, technology has kept up with the demands of the CAA.<sup>62</sup>

#### C. Pew Center on Global Climate Change

The Pew Center Program is a non-profit, non-partisan, independent organization whose main focus is to provide credible information and creative solutions to address changes in the global climate.<sup>63</sup> This program brings together business leaders, policy makers, scientists, and other similar experts to address global warming.<sup>64</sup> In an effort to achieve their mission, the program initiated “advertising and public relations programs to educate the public and government officials on the importance of . . . mitigat[ing] carbon emissions and to promote U.S. ratification of the Kyoto Protocols.”<sup>65</sup>

#### D. CAFE – Corporate Average Fuel Economy Standards

After the Arab oil ministers’ decisions in 1973 to cut supplies to the United States, the Energy Policy and Conservation Act was adopted.<sup>66</sup> The scope of Corporate Average Fuel Economy (“CAFE”) Standards includes “all automobiles manufactured by persons who control, are controlled by, or are under common control with, the manufacturer, less those automobiles that are exported.”<sup>67</sup> There are also civil penalties for failure to attain CAFE standards.<sup>68</sup> Title V of the Act authorized fuel efficiency standards requiring “companies selling autos in the United States [to] reach a sales-weighted CAFE of eighteen miles per gallon by 1978. . . .”<sup>69</sup> Miles per gallon increased over the years, eventually reaching 27.5 in 1985.<sup>70</sup> Congress allowed exceptions for light trucks (including sports utility vehicles) and completely exempted large trucks to make allowances for

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<sup>61</sup> *Id.* at 272.

<sup>62</sup> *See id.* at 273.

<sup>63</sup> The Pew Center on Global Climate Change, History and Mission, [http://www.pewclimate.org/about/history\\_and\\_mission/](http://www.pewclimate.org/about/history_and_mission/) (last visited Apr. 4, 2007).

<sup>64</sup> The Pew Center on Global Climate Change, About Us, <http://www.pewclimate.org/about/> (last visited Apr. 4, 2007).

<sup>65</sup> Ottinger & Jayne, *supra* note 16, at 73-74.

<sup>66</sup> *See* Mayer, *supra* note 9, at 619.

<sup>67</sup> Tanyarat Mungkalarungsi, *The Trade and Environment Debate*, 10 TUL. J. INT’L & COMP. L. 361, 372 (2002).

<sup>68</sup> *Id.*

<sup>69</sup> Mayer, *supra* note 9, at 619.

<sup>70</sup> *Id.*

farmers and ranchers.<sup>71</sup> As demand for large cars grew, the standards fluctuated up and down finally coming to rest at the 1985 level.<sup>72</sup>

#### IV. UNITED STATES'S FAILURE TO RATIFY THE KYOTO PROTOCOL AND THE WORLD'S RESPONSE

Although the United States has national legislation in place to limit emissions, no measures to adopt standards that would benefit the international community as a whole have occurred.

##### A. Auto Industry Response to Kyoto Protocol

For most of the 1990s, the auto industry did not endorse alternative fuel vehicles, higher taxes on gasoline, increased fuel efficiency mandates on internal combustion engines, and the use of technology for zero emissions vehicles.<sup>73</sup> While refusing to endorse these ideas, the industry also failed to suggest any policy alternatives.<sup>74</sup>

Fossil fuels provide about 85% of the world's commercial energy.<sup>75</sup> The automobile industry is the world's leading industry with the oil industry a close second; "[s]even of the ten largest industrial corporations in the United States are either oil or auto companies."<sup>76</sup> The two industrial leaders frequently engage in lobbying activities that will substantially weaken certain environmental legislation and regulations.<sup>77</sup> Besides its lobbying influence within the U.S. government, the oil industry is provided with subsidies in the form of depreciation allowances, accelerated depreciation, and other tax incentives by the government that reduce their effective income tax rate below the average for other industries.<sup>78</sup> The auto industry also receives substantial help from federal and state governments; the different levels of government "combine[] to provide highway construction, bridges, tunnels, and traffic signs and signals. . . ."<sup>79</sup> Oil companies benefit from this as well, as gasoline is the primary fuel for motor vehicles within the United States.<sup>80</sup>

The United States has less than 5% of the world's population but accounts for close to 25% of all greenhouse gases.<sup>81</sup> "U.S. emissions of

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<sup>71</sup> *Id.* at 620.

<sup>72</sup> *See id.*

<sup>73</sup> *Id.* at 613.

<sup>74</sup> *Id.*

<sup>75</sup> Mayer, *supra* note 9, at 609.

<sup>76</sup> *Id.* at 609–10.

<sup>77</sup> *See id.* at 608, 622–23.

<sup>78</sup> *Id.* at 605–06.

<sup>79</sup> *Id.* at 607.

<sup>80</sup> *Id.*

<sup>81</sup> Mayer, *supra* note 9, at 611.

carbon dioxide from transportation ha[ve] grown 8.5% since 1990.”<sup>82</sup> Since 1992, U.S. gasoline consumption has increased.<sup>83</sup> The nation has also generated more GHG emissions with the transportation sector leading the way.<sup>84</sup>

When the requirements of Kyoto were revealed, considerable opposition emerged in the United States with protecting business interests being of the greatest importance.<sup>85</sup> The Global Climate Coalition (“GCC”) was created to battle the reduction commitments set out in Kyoto.<sup>86</sup> The members of this coalition include: the American Petroleum Institute, Ford, General Motors, Chrysler, Dow Chemical, DuPont, ExxonMobil, American Automobile Manufacturers Association, Chevron, Shell, Texaco, and Union Carbide.<sup>87</sup> The members of the GCC used the following strategies to defeat ratification of Kyoto:

- (1) raising public concern[] about unemployment . . . from emission regulations, (2) releasing reports . . . that questioned whether global warming was [actually] taking place, (3) attending climate negotiation meetings “en masse”, (4) sending a letter “signed by 119 of the United States’s most prominent business leaders” to President Clinton, asking that all current climate proposals be rejected, and (5) insisting that developing countries commit to the same stringent reductions as industrialized nations.<sup>88</sup>

Though U.S. automakers are subject to a host of federal and state laws regulating certain aspects of their industry, “some of the most significant legislative and regulatory mandates have been strongly opposed by auto companies.”<sup>89</sup> The majority of auto companies seem to resist any proposal that would cause a decrease in profits.<sup>90</sup>

In 2002, “legislation was introduced in the Senate that would raise average fuel efficiency” and “classify minivans and SUVs as passenger vehicles rather than light trucks.”<sup>91</sup> This resulted in lobbying of the Senate and the public by the auto industry, which made the following arguments:

- (1) lighter vehicles are not . . . safe, (2) a doubling of fuel economy . . . will not appreciably alter GHG emission levels . . . (3) . . . forty

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<sup>82</sup> *Id.*

<sup>83</sup> *Id.* at 610.

<sup>84</sup> *Id.*

<sup>85</sup> *Id.* at 612.

<sup>86</sup> *Id.*

<sup>87</sup> Mayer, *supra* note 9, at 612.

<sup>88</sup> *Id.*

<sup>89</sup> *Id.* at 608.

<sup>90</sup> *Id.*

<sup>91</sup> *Id.* at 622.

miles per gallon is only half as fuel efficient, making emission reductions almost insignificant, (4) global warming is not a problem . . . (5) consumers want choice[s] . . . (6) existing CAFE regulations are . . . inefficient . . . (7) an increase in gasoline taxes would be more efficient . . . and (8) market forces [would be a better source of regulation] . . . .<sup>92</sup>

However, despite past lobbying and refusal to see problems, U.S. automakers finally came to their senses: in 2000, Ford acknowledged that its SUVs created more environmental and safety problems than their cars and withdrew from GCC; DaimlerChrysler also quit the coalition, citing it as an impediment to the pursuit of environmental initiatives; GM left the GCC as well acknowledging that carbon dioxide build-ups could be affecting the world's climate, but continued to oppose Kyoto, most likely because they considered it to be too extreme.<sup>93</sup>

The question now is why, after recognizing the threat of global warming, U.S. automakers are still not supporting Kyoto. If U.S. automakers truly realize the environmental problems their products are causing and have the means to create more energy efficient products, they should also realize that, in the long run, Kyoto's ratification would benefit them. Even if U.S. automakers oppose Kyoto as being too extreme, they are still not making an effort to support less drastic remedies, like an additional tax on gasoline. The industry is already supported by federal and state governments and has significant lobbying power. Automakers have acknowledged that there are environmental harms attributed to the use of their products. The industry continues to lose market share as foreign automakers continue to gain and have even overtaken U.S. automakers.<sup>94</sup> Instead of fighting Kyoto, the industry's power could be used to push for ratification of the Kyoto Protocol as a way to help the industry progress and stay competitive. The industry could lobby the government for support not only of the Protocol, but also for development of technologies that will be beneficial to the American public in many different ways, including improving the environment and revitalizing an industry that supports many American workers.

#### B. Governments Response to Kyoto Protocol

In addition to the automakers and the oil industry in this country having a problem with Kyoto, the government has also questioned the CBDR that provided the basis for Kyoto. In 1997, the Byrd-Hagel

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<sup>92</sup> *Id.* at 623.

<sup>93</sup> See Mayer, *supra* note 9, at 633.

<sup>94</sup> See *infra* Part V.B.1.; see also Ulrich, *supra* note 1.

Resolution was unanimously approved by the Senate.<sup>95</sup> The resolution stated that “the United States should not be a signatory to any . . . agreement regarding, the Climate Convention that would (A) mandate new commitments to limit or reduce GHG emissions . . . [by] Annex I Parties. . . or (B) [commitments that] would result in serious harm to the economy of the United States.”<sup>96</sup> The Senate was concerned that developing countries would receive an unfair economic advantage.<sup>97</sup> These concerns stemmed from a belief that U.S. manufacturing and jobs would move abroad and the future emissions of China were a concern as well since they would not face the same burdens placed on America.<sup>98</sup> This is well-founded, considering China is currently second behind the United States in carbon dioxide emissions.<sup>99</sup> The Clinton administration sought to amend Kyoto so as to limit developing countries’ emissions in a meaningful way, but this effort failed.<sup>100</sup>

The concerns of the Senate appear to be valid, but the debate continues about the cost of implementing Kyoto. The key objection to compliance with Kyoto is that it would impose an unacceptable economic burden,<sup>101</sup> but the economic cost of global warming may never be accurately estimated.<sup>102</sup> In addition, if countries solely take into account local external and production costs and identify effective energy strategies, compliance with Kyoto would imply lower, not higher overall costs (after transition costs).<sup>103</sup> Since transportation is a major industry, the move towards more efficient vehicles would no doubt find its place in the market.

The IPCC 2007 report confirms that human activity is the major reason for climate change<sup>104</sup> and this revelation will undoubtedly affect the automobile industry.

The Bush administration opposes the international drive to phase out fossil fuel subsidies and increase financing for non-polluting energy sources.<sup>105</sup> The current administration’s opposition stems from the desire to let the marketplace fix itself and to decide how quickly renewable energy sources will be adopted.<sup>106</sup> The Bush-Cheney energy plan does not mention

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<sup>95</sup> Harris, *supra* note 52, at 36.

<sup>96</sup> *Id.* at 36–37.

<sup>97</sup> *Id.* at 37.

<sup>98</sup> *Id.* at 37–38.

<sup>99</sup> *Id.* at 31.

<sup>100</sup> *See id.* at 35–36.

<sup>101</sup> De Leo et. al, *Carbon Emissions: The Economic Benefits of the Kyoto Protocol*, NATURE 413, 478 (Oct. 4, 2001).

<sup>102</sup> *Id.*

<sup>103</sup> *Id.*

<sup>104</sup> CLIMATE CHANGE 2007, *supra* note 14.

<sup>105</sup> Mayer, *supra* note 9, at 614.

<sup>106</sup> *Id.*

Kyoto and focuses on increasing energy supplies using coal, oil, gas, and nuclear energy (the only non-polluting source of energy); the plan refers to efficiency, renewable energy, equity, and the environment as minor issues that are at the margin of the energy policy.<sup>107</sup> To an extent, this *laissez faire* economics approach to energy sources seems to be working. New technologies are being researched and developed. However, by failing to emphasize the importance of changing energy sources, the Bush-Cheney Energy plan further delays American industries' ability to adjust to changes being made around the world. Though technologies are being researched and developed, they are not being implemented in a timely manner.<sup>108</sup> Considering how far behind U.S. automakers already are, the best way to have these technologies developed is through government support of the auto industry. As will be discussed later, foreign automakers have already entered into the automobile market with new technologies that make their line of cars ever more fuel efficient.<sup>109</sup>

With the lack of congressional support, it is not surprising that Bush rejected Kyoto. After failed negotiations at the Hague in 2000, Bush rejected the Kyoto Protocol in 2001 arguing that it imposed unacceptable domestic economic costs, that the overall reduction of 5% was not enough, and that some American scientists questioned the evidence of global warming.<sup>110</sup> This is yet another instance of American opposition without coming up with any real alternatives. If the American government did not believe there were some problems with GHG emissions, there would not be so many national regulations in place to control emissions. However, these regulations have done little to change U.S. automakers overall approach to vehicle production of more fuel efficient vehicles. While it may be argued that developing countries at some point in time should have restrictions placed on them, the initial time period for Kyoto is five years, after which the United States and other nations may be able to reach an agreement for restrictions on less developed nations. Regardless, as a contributor of 25% of GHG emissions in the world, the United States should take some responsibility for its part of the problem, regardless of the lack of restrictions on developing countries.

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<sup>107</sup> *Id.*

<sup>108</sup> See discussion *infra* Part V.

<sup>109</sup> *Toyota, Honda Dominate Government's List of Fuel-efficient Vehicles*, USA TODAY, Oct. 18, 2006, available at [http://www.usatoday.com/money/autos/2006-10-17-fuel-economy\\_x.htm](http://www.usatoday.com/money/autos/2006-10-17-fuel-economy_x.htm) (last visited Apr. 12, 2007) [hereinafter *Toyota, Honda Dominate*].

<sup>110</sup> Bessendorf, *supra* note 32, at 336.

### C. Europe's Response to Bush's Rejection of Kyoto

After learning that the United States would not adopt Kyoto, other industrialized nations, like those in Europe, found themselves in a precarious position. The problem is that many other European countries have exceeded their carbon dioxide emissions targets and feared that adopting Kyoto has handed the United States "further competitive advantages without realizing any environmental benefits."<sup>111</sup> As a world leader, the United States sets the tone. By not ratifying Kyoto, the United States could potentially, in the short-term, widen its advantage over other nations.<sup>112</sup> Clearly those countries not bound by the restrictions in Kyoto would be able to gain a competitive advantage by not incurring the expenses needed to reduce GHG emissions with higher energy prices.<sup>113</sup>

But this competitive advantage is not so clear. This supposed advantage can be offset through the use of subsidies.<sup>114</sup> If a country bound by Kyoto sought to promote cleaner fuels or energy efficiency, it could do so through direct subsidies or tax breaks.<sup>115</sup> Companies receiving these benefits could in turn gain a competitive advantage over U.S. companies that do not receive similar subsidies.<sup>116</sup> Additionally, a consulting firm that studied the effects of Kyoto on U.S. companies noted that U.S. companies are actually at a competitive disadvantage due to companies in the rest of the world taking action to become compliant with Kyoto.<sup>117</sup> These changes in business practices stemmed from Russia's ratification of Kyoto.<sup>118</sup> Because companies around the world will have to meet Kyoto's requirements, they will reduce their emissions and sell lower-impact carbon

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<sup>111</sup> Bret Stephens, *Why Bush's "No" to Kyoto Vexed Europe*, [http://www.europeanaffairs.org/archive/2001\\_summer/2001\\_summer\\_78.php4](http://www.europeanaffairs.org/archive/2001_summer/2001_summer_78.php4) (last visited Apr. 6, 2007).

<sup>112</sup> *See id.*

<sup>113</sup> Mungkalarungsi, *supra* note 67, at 385.

<sup>114</sup> PEW CENTER ON GLOBAL CLIMATE CHANGE, IMPLICATIONS FOR U.S. COMPANIES OF KYOTO'S ENTRY INTO FORCE WITHOUT THE UNITED STATES 5 (2002), <http://www.pewclimate.org/docUploads/Kyoto-USBusiness.pdf> [hereinafter Pew Center, *Implications for U.S. Companies*].

<sup>115</sup> *Id.*

<sup>116</sup> *Id.*

<sup>117</sup> Press Release, ICF International, US Companies at Competitive Disadvantage in Global Marketplace (Nov. 10, 2004), *available at* <http://www.icfi.com/Newsroom/US-Kyoto-2004.asp>.

<sup>118</sup> *Id.* The Kyoto Protocol required 55% participation from developed countries to enter into force; the minimum participation level was reached when Russia ratified in 2004. Press Release, ICF International, ICF Consulting Estimates 350 Million Tonnes of Carbon Credits Unlocked by Ratification of Kyoto Protocol by Russia (Oct. 20, 2004), *available at* <http://www.icfi.com/Newsroom/russia-kyoto-2004.asp>. [Ed note: added the explanatory footnote because it was unclear just from the text why Russia's ratification was significant].

products.<sup>119</sup> U.S. companies that are unprepared will lose major business opportunities because of this change in the market.<sup>120</sup> These international companies have already made aggressive moves to compete in a world where carbon constraints will become more stringent.<sup>121</sup> The international market recognizes that climate change will offer risks and opportunities for businesses and that, by anticipating and preparing for these changes, businesses can gain a competitive advantage in the global market.<sup>122</sup> Furthermore, this disadvantage could harm U.S. firms with technologies capable of reducing GHG emissions by “limiting their opportunities to develop experience and relations under” Kyoto.<sup>123</sup>

Edmund Andrews of the New York Times believes that Europeans are angry with the United States because the latter appears to be “oblivious to widespread environmental concerns across most of Europe,” and that because of its relative size, the United States can undermine treaties that have been negotiated by hundreds of other countries.<sup>124</sup> It is suggested that if the United States wants to be a world leader, the United States must recognize that the position comes with the responsibility of looking after the entire earth and not just the domestic industries.<sup>125</sup> If the United States is not willing to do that, Europe is now in the position to take the lead.<sup>126</sup> With Russia’s ratification of Kyoto, the power and influence over changes to be made has shifted away from the United States and into the hands of the European Union.<sup>127</sup>

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<sup>119</sup> Press Release, ICF International, *supra* note 117.

<sup>120</sup> *Id.*

<sup>121</sup> *Id.*

<sup>122</sup> *Id.*

<sup>123</sup> Pew Center, *Implications for U.S. Companies*, *supra* note 114, at 2.

<sup>124</sup> Stephens, *supra* note 111.

<sup>125</sup> *Id.* (quoting then-EU Commission President Romano Prodi).

<sup>126</sup> CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES, RUSSIA JOINING THE KYOTO PROTOCOL (2004), <http://www.globalization101.org/index.php?file=news1&id=46> (last visited Apr. 7, 2007) (“Russia’s [ratification of Kyoto] . . . has strengthened the [E.U.] role as the global leader in fighting greenhouse-gas emissions.”).

<sup>127</sup> *Id.* The report lists three potential ways by which the European Union can take the lead:

First, the major legal system of this new and expanding international market [for carbon emission allowances] will be European-based. Second, the [E.U.] is likely to set the global standard of carbon allowance trading. . . . Third, the fact that the [E.U.] has taken significant steps towards reducing carbon emission might have “given its businesses an edge in the race towards clean energy.”

*Id.* (citation omitted).



## V. ADVANCES IN CAR TECHNOLOGY

In the last several years, there have been several technological advances in the automobile industry for producing more energy efficient cars. These advances in technology—including hybrid vehicles, fuel cell technology, and alternative fuels—provide ways to reduce dependency on oil now and in the future. As discussed below, many of these technologies face problems with implementation. Most would require a significant financial outlay only the government can provide.

### A. Hybrid Vehicles

Hybrid-electric vehicles combine gasoline engines with electric motors and can be configured to achieve different objectives, including better fuel economy and increased power.<sup>128</sup> The standard technology can be one of the following: regenerative braking, electric motor drive, and automatic start or shutoff.<sup>129</sup>

With regenerative braking, the electric motor applies resistance on the drivetrain, in turn causing the wheels to slow down.<sup>130</sup> The energy from the wheels turns the motor, turning energy that is normally wasted while a car is coasting into electricity that will be stored in the battery.<sup>131</sup> Electric motor drive technology works by way of the electric motor providing additional power in order to assist the engine when the vehicle is accelerating, passing, or climbing hills.<sup>132</sup> The Automatic start/shutoff hybrid will automatically shut the engine off when the driver comes to a stop and restart when the driver presses on the accelerator.<sup>133</sup>

Purchasing a vehicle with hybrid technology also generates a tax benefit for the buyer. This tax benefit can be applied as far back as the year 2000.<sup>134</sup> For the original purchaser of a qualifying hybrid vehicle, a deduction of \$2000 is allowed for the year the vehicle is first used, provided that the year is before 2006.<sup>135</sup> The deduction is only available for vehicles purchased and in use before 2006; as of 2006, the deduction has been replaced with a credit that requires a different certification by the IRS.<sup>136</sup>

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<sup>128</sup> FuelEconomy.gov, How Hybrids Work, <http://www.fueleconomy.gov/feg/hybridtech.shtml> (last visited Apr. 6, 2007).

<sup>129</sup> *Id.*

<sup>130</sup> *Id.*

<sup>131</sup> *Id.*

<sup>132</sup> *Id.*

<sup>133</sup> *Id.*

<sup>134</sup> IRS, Clean-Fuel Vehicle Deduction Available for Certain Models, <http://www.irs.gov/newsroom/article/0,,id=104549,00.html> (last visited Apr. 6, 2007).

<sup>135</sup> *Id.*

<sup>136</sup> IRS, IRS Certifies 2006 Toyota Prius Hybrid Vehicle for 2005 Deduction, <http://www.irs.gov/newsroom/article/0,,id=154318,00.html> (last visited Apr. 6, 2007).

The credit will allow those who purchase certified vehicles to receive a credit of up to \$3400.<sup>137</sup>

### B. Fuel Cell Technology

Fuel cells harness the electricity created from the chemical reaction that occurs from combining hydrogen and oxygen.<sup>138</sup> “[The] fuel cells are ‘stacked’ together [and] combin[e] their electrical outputs into enough electricity to power a car.”<sup>139</sup> There are, however, several challenges to implementing the fuel cell technology: hydrocarbon fuel reforming, hydrogen storage, cost reduction, and infrastructure development all must be addressed before the implementation can occur.<sup>140</sup>

With hydrocarbon fuel reforming, the problem extends from changing over a completely oil-based gasoline system into one based on hydrogen.<sup>141</sup> The issue with hydrogen storage is that automakers must find a way to make hydrogen tanks as space efficient and easy to refill as gasoline tanks.<sup>142</sup> The problem with cost is that even with the significant decrease in price over the past couple of years, “the price is still too high to gain commercial support for use in vehicles . . . .”<sup>143</sup> Moreover, there is no significant infrastructure right now to support a change to hydrogen fuel systems.<sup>144</sup>

### C. Alternative Fuels

Hydrogen is “produced from natural gas in a process relatively free of carbon dioxide and other pollutants . . . .”<sup>145</sup> With more improved and economically efficient technology, it could be produced from photovoltaic-powered electrolysis that separates hydrogen from water and from some natural seawater sources as well.<sup>146</sup> Hydrogen would most likely be used in fuel cell technology because the combustion that occurs between hydrogen and oxygen releases water and is virtually pollution free.<sup>147</sup> Hydrogen is

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<sup>137</sup> *Id.*

<sup>138</sup> GM, How Fuel Cells Work, [http://www.gm.com/company/gmability/adv\\_tech/400\\_fc/fc\\_work.html](http://www.gm.com/company/gmability/adv_tech/400_fc/fc_work.html) (last visited Apr. 6, 2007).

<sup>139</sup> *Id.*

<sup>140</sup> GM, Fuel Cell Technology: Prospects, Promises and Challenges, [http://www.gm.com/company/gmability/adv\\_tech/400\\_fc/fc\\_challenges.html](http://www.gm.com/company/gmability/adv_tech/400_fc/fc_challenges.html) (last visited Apr. 6, 2007).

<sup>141</sup> *Id.*

<sup>142</sup> *Id.*

<sup>143</sup> *Id.*

<sup>144</sup> *Id.*

<sup>145</sup> Ottinger & Jayne, *supra* note 16, at 39.

<sup>146</sup> *Id.*

<sup>147</sup> *Id.*

transportable in pipelines and can be utilized in either a solid or liquid form by vehicles.<sup>148</sup> The only problem is that the cost needs to be reduced on hydrogen production and fuel cells as mentioned above.<sup>149</sup>

In addition to hydrogen, many automakers are developing automobiles that run on ethanol. Ethanol is a renewable fuel made from United States grown agricultural materials such as corn or grain products.<sup>150</sup> The price of ethanol fluctuates like that of gasoline but is more consistent.<sup>151</sup> The benefits of ethanol include the following: reduced GHG emissions, reduced dependence on petroleum, improved engine performance, reduction in smog forming emissions, and support of the agricultural industry.<sup>152</sup> There are currently more than a thousand ethanol fueling stations nationwide and plans for more stations are in the works.<sup>153</sup> Right now, General Motors has two million ethanol vehicles on the road.<sup>154</sup> However, there are still some obstacles to overcome, such as making ethanol fuel more widely available and increasing the cruising range of ethanol.<sup>155</sup>

## VI. UNITED STATES VERSUS FOREIGN AUTOMAKERS

While there are obvious challenges to some of the technology, the ability to produce hybrid cars appears to be unimpeded by any of the obstacles facing the other available technologies. Yet, as the following discussion will show, U.S. automakers lag behind foreign automakers in production of the vehicles and their introduction into the market. Some environmental and consumer groups fault American automakers for failing to take the lead in fuel efficiency and in part, credit the success of foreign automakers to their focus on fuel economy above size and engine power.<sup>156</sup>

### A. U.S. Automakers

Consumer choice has driven the U.S. auto industry. The automakers have been developing these environmentally-friendly technologies but have

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<sup>148</sup> *Id.*

<sup>149</sup> *Id.*

<sup>150</sup> GM, E85: Explained, <http://www.gm.com/company/onlygm/livegreengoyellow/index.html> (follow "E85: explained" hyperlink; then follow "FAQ" hyperlink") (last visited Apr. 6, 2007).

<sup>151</sup> *Id.*

<sup>152</sup> *Id.* (follow "why it's great" hyperlink).

<sup>153</sup> *Id.* (follow "FAQ" hyperlink).

<sup>154</sup> *Id.* (follow "what it is" hyperlink).

<sup>155</sup> *Id.* (follow "FAQ" hyperlink).

<sup>156</sup> Ron Edmonds, *Big Three Automakers Discuss Woes with Bush*, <http://www.npr.org/templates/story> (last visited Jan. 12, 2007).

publicized them poorly.<sup>157</sup> With America's big three automakers all posting losses in the third quarter of 2006, it is evident that change needs to occur.<sup>158</sup>

### *1. General Motors*

Currently, GM offers the following hybrid vehicles: the 2006 Chevrolet Silverado Classic, 2006 GMC Sierra Classic, 2007 Saturn Vue Greenline, 2008 Chevy Tahoe, and 2008 GMC Yukon.<sup>159</sup> GM has launched a hybrid propulsion program introducing "three distinct hybrid propulsion systems that vary in fuel economy, savings[,] and cost."<sup>160</sup> In 2003, GM introduced the GM Allison hybrid electric diesel propulsion system for buses to be used in mass transit.<sup>161</sup> These buses provide significant improvement in overall fuel economy, dramatically lower emissions, and better acceleration than conventional diesel buses.<sup>162</sup> GM has delivered these buses to more than twenty-five cities in the United States and Canada including Seattle, Minneapolis, Portland, Salt Lake City, Houston, and Austin.<sup>163</sup> In 2004, GM announced the start of a hybrid bus program with the Shanghai Automotive Industry Corporation for the China Market with plans to deliver hybrid bus technology around the world by the end of the decade.<sup>164</sup>

In 2004, GM also introduced the world's first hybrid pickup trucks with the Chevy Silverado and GMC Sierra, which both use the flywheel alternator starter hybrid system. These trucks deliver 10% better fuel economy and the highest city fuel economy of any full-size truck.<sup>165</sup> These trucks are in use in Miami-Dade County.<sup>166</sup> In 2006, GM plans to introduce the Belt Alternator Starter hybrid system in the 2007 Saturn VUE Greenline now available at Saturn dealerships.<sup>167</sup> This hybrid system will offer fuel economy savings over conventional vehicles as well as being one of the

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<sup>157</sup> Mayer, *supra* note 9, at 623.

<sup>158</sup> Edmonds, *supra* note 156.

<sup>159</sup> GM, Hybrid Vehicles Help GM Improve Fuel Economy, Reduce Emissions, [http://www.gm.com/company/gmability/adv\\_tech/300\\_hybrids/index.html](http://www.gm.com/company/gmability/adv_tech/300_hybrids/index.html) (last visited Jan. 7, 2007).

<sup>160</sup> GM, GM's Hybrid Timeline, [http://www.gm.com/company/gmability/adv\\_tech/300\\_hybrids/hyb\\_timeline.html](http://www.gm.com/company/gmability/adv_tech/300_hybrids/hyb_timeline.html) (last visited Jan. 7, 2007) [hereinafter GM's Hybrid Timeline].

<sup>161</sup> *Id.*

<sup>162</sup> *Id.*

<sup>163</sup> *Id.*

<sup>164</sup> *Id.*

<sup>165</sup> *Id.*

<sup>166</sup> GM's Hybrid Timeline, *supra* note 160.

<sup>167</sup> GM, 2007 Saturn Vue Greenline, [http://www.gm.com/company/gmability/adv\\_tech/300\\_hybrids/fact\\_suvs.html](http://www.gm.com/company/gmability/adv_tech/300_hybrids/fact_suvs.html) (last visited Jan. 12, 2007).

most affordable hybrids for consumers.<sup>168</sup> At this year's auto show, GM displayed a gas-electric hybrid Malibu set to be released in the fourth quarter of 2007.<sup>169</sup> The hybrid Malibu will use a single-mode hybrid system much like that of the Saturn Vue; however, this technology is not designed to power the car on electricity like the Toyota Prius and Ford Escape Hybrid.<sup>170</sup>

GM has also made major breakthroughs in fuel cell technology. They have established extensive hydrogen fuel cell research and development facilities in the United States and Europe.<sup>171</sup> These facilities have produced the AUTOMony, a concept vehicle that shows the potential for hydrogen fuel cell technology, and the Hy-Wire which has no internal combustion engine, instrument panel, brake, or accelerator pedals and is instead controlled by a single docking port that uses electrical signals.<sup>172</sup> In addition, GM introduced the Chevrolet Volt at this year's auto show.<sup>173</sup> The Volt is a four passenger, battery-powered car featuring GM's first use of the new E-flex electric propulsion system which is designed to provide flexibility with fuel source choices.<sup>174</sup> The system requires an electric motor to power the wheels but can be configured to use electricity from a fuel cell generator powered by the engine or from a battery.<sup>175</sup> The battery can be charged by plugging it into a 110 volt outlet for six hours and has a driving range of forty miles fully charged.<sup>176</sup> The engine is designed to run on ethanol and is only used to produce electricity so the battery can recharge. However, it is unclear whether this car can actually be produced without a massive leap in battery technology.<sup>177</sup>

Along with their advances in technology, GM has formed many partnerships and alliances with others in its industry. GM has agreements with Toyota for advanced vehicle technologies, Suzuki Motor Corporation for small fuel-celled vehicle development, and BMW for hydrogen refueling.<sup>178</sup> They also recently formed a global alliance with BMW and

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<sup>168</sup> *Id.*

<sup>169</sup> Ann Job, *Redesigned 2008 Chevy Malibu*, MSN, Jan. 9, 2007, <http://autoshow.autos.msn.com/autoshow/detroit2007>.

<sup>170</sup> *Id.*

<sup>171</sup> GM, *Reinventing the Automobile with Fuel Cell Technology*, [http://www.gm.com/company/gmability/adv\\_tech/400\\_fcvt/index.html](http://www.gm.com/company/gmability/adv_tech/400_fcvt/index.html) (last visited Jan. 4, 2007).

<sup>172</sup> *Id.*

<sup>173</sup> Mike Meredith, *Chevrolet Volt Electric Concept*, MSN, Jan. 7, 2007, <http://autoshow.autos.msn.com/autoshow/detroit2007>.

<sup>174</sup> *Id.*

<sup>175</sup> *Id.*

<sup>176</sup> *Id.*

<sup>177</sup> Ulrich, *supra* note 1.

<sup>178</sup> GM, *GM Fuel Cell Partnerships & Alliances*, [http://www.gm.com/company/gmability/adv\\_tech/700\\_partners/index.html](http://www.gm.com/company/gmability/adv_tech/700_partners/index.html) (last visited Jan. 4, 2007).

DaimlerChrysler to develop a two-mode hybrid drive system.<sup>179</sup> GM has also made agreements with Shell for hydrogen infrastructure and refueling, ExxonMobil, ChevronTexaco and BPAmoco for fuel research and gasoline processing.<sup>180</sup> For Fuel Cell Technology, GM has established relationships with QUANTUM Fuel System Technologies Worldwide, General Hydrogen, Hydrogenics, Giner Electrochemical Systems, and the California Fuel Cell Partnership.<sup>181</sup> But despite all the alliances and advancements being made, GM hybrid vehicles will not be available to the public for at least another year and a half.

GM has also developed ethanol capable vehicles designated as E85 FlexFuel Vehicles. GM produces a wide range of FlexFuel vehicles and currently offers the most choices in these types of vehicles for consumers.<sup>182</sup> By 2012, the partnership formed among GM, Ford, and Daimler-Chrysler looks to produce half of their annual vehicles as E85 Flexible or Biodiesel capable.<sup>183</sup> And in an effort to increase the number of ethanol pumps, GM is working with fuel suppliers in California and with government, fuel providers, and retailers in other states to bring ethanol to consumers sooner.<sup>184</sup>

## *2. Ford*

Ford is currently the only American automaker that has hybrid vehicles available to the public. In 2006, Ford released the Ford Escape Hybrid and the 2006 Mercury Mariner Hybrid.<sup>185</sup> At the moment, Ford has over a hundred patent applications in progress and has plans for three more hybrid models to be introduced into the market; its goal was to lead the way in defining the American Hybrid and it has done that.<sup>186</sup> Its hybrid vehicles boost 81% fewer smog-forming emissions and the ability to travel between 400 and 500 miles on a single tank of gas.<sup>187</sup> As the first American automaker to enter the hybrid market, Ford is taking the steps necessary to begin establishing themselves within the market. In addition, Ford has also

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<sup>179</sup> GM, Global Alliance for Hybrid Drive Development: Cooperation Between BMW, DaimlerChrysler and GM, [http://www.gm.com/company/gmability/adv\\_tech/100\\_news](http://www.gm.com/company/gmability/adv_tech/100_news) (last visited Jan. 4, 2007).

<sup>180</sup> *Id.*

<sup>181</sup> *Id.*

<sup>182</sup> GM, E85: Explained, <http://www.gm.com/company/onlygm/livegreengoyellow/index.html> (follow "E85: explained" hyperlink; then follow "which GM vehicles can use it" hyperlink) (last visited Apr. 12, 2007).

<sup>183</sup> *Id.* (follow "what it is" hyperlink).

<sup>184</sup> *Id.* (follow "where it is" hyperlink).

<sup>185</sup> Ford, Hybrid Technology, <http://www.ford.com/en/innovation/engineFuelTechnology/modularHybridTransmission.html> (last visited Jan. 4, 2007).

<sup>186</sup> *Id.*

<sup>187</sup> *Id.*

developed four ethanol vehicles: F-150 FFV, Crown Victoria FFV, Grand Marquis FFV, and Lincoln Town Car FFV.<sup>188</sup>

Ford is also in the process of developing a hydrogen internal combustion engine. The Ford Model U Concept is propelled by an internal combustion engine that runs on hydrogen fuel instead of gasoline; the engine is supercharged and intercooled to produce maximum efficiency.<sup>189</sup> The Mode U's emissions are nearly zero and the engine is about 25% more fuel efficient than a typical gasoline engine.<sup>190</sup> The lack of carbon atoms in the fuel eliminates the production of hydrocarbon or carbon dioxide emissions; oxides of nitrogen are low and catalyst research may soon reduce tailpipe output of potential smog-forming emissions well below the current conditions in many cities.<sup>191</sup>

In 2005, Ford delivered its Focus Fuel Cell Vehicles ("Focus FCV") to demonstration programs throughout North America and Europe.<sup>192</sup> The Focus FCV was one of the industry's first hybridized fuel cell vehicles but it has yet to be put into production.<sup>193</sup> Ford believes this is a milestone in its long term goal towards more hydrogen powered cars and has even developed more models.<sup>194</sup> However, Honda appears poised to enter the market first with the FCX concept set to come out in 2008.<sup>195</sup>

At the 2006 auto show, Ford introduced the Ford Airstream Concept, a battery powered, plug-in hybrid with an on-board hydrogen fuel cell charger.<sup>196</sup> The new HySeriesDrive used in this concept car allows the vehicle to travel twenty-five miles on a full electric charge.<sup>197</sup> When the battery has been depleted at least 40%, the hydrogen fuel cells begin to generate electricity to recharge the battery and increase the driving range another 280 miles.<sup>198</sup> The car can be charged by plugging into any outlet.<sup>199</sup>

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<sup>188</sup> Ford, Ethanol Vehicles, [www.ford.com /en/vehicles/specialityVehicles/environmental/ethanol.htm](http://www.ford.com/en/vehicles/specialityVehicles/environmental/ethanol.htm) (last visited Jan. 7, 2007).

<sup>189</sup> Ford, Hydrogen Internal Combustion, <http://www.ford.com/en/innovation/engineFuelTechnology/hydrogenInternalCombustion.htm> (last visited Jan. 4, 2007).

<sup>190</sup> *Id.*

<sup>191</sup> *Id.*

<sup>192</sup> Ford, Fuel Cell Vehicles, <http://www.ford.com/en/vehicles/specialtyVehicles/enironmental/fuelcell/default.htm> (last visited Jan. 7, 2007).

<sup>193</sup> *Id.*

<sup>194</sup> *Id.*

<sup>195</sup> Honda, Honda FCX Hydrogen Fuel-Cell Car, <http://automobiles.honda.com/future-cars/index.asp?ModelStart=fcx> (last visited May 18, 2007).

<sup>196</sup> John Fossen, *Ford Debuts New Powertrains at North American International Auto Show*, FORD COMM'NS NETWORK, Jan. 10, 2006, [http://media.ford.com/newsroom/feature\\_display.cfm?release=24531](http://media.ford.com/newsroom/feature_display.cfm?release=24531).

<sup>197</sup> *Id.*

<sup>198</sup> *Id.*

<sup>199</sup> *Id.*

However, there is no indication that this system will be put into production.<sup>200</sup>

### 3. DaimlerChrysler

To date, DaimlerChrysler received the largest hybrid electric bus order with 500 of their Orion VII buses ordered by the New York City Transit and MTA Bus. Of the 500 buses ordered, New York ordered 216 and the MTA ordered the remainder.<sup>201</sup> Delivery of the buses will begin in the second quarter of 2006, and this is the third order for hybrid buses, which have increased from 125 and 200 units.<sup>202</sup> Their commercial vehicle division has also developed hybrid drive systems for the light truck and van segments along with advanced diesel engines that include SCR technology for its medium and heavy duty Mercedes Benz trucks and buses.<sup>203</sup> Orion is the leading brand of hybrid buses worldwide with more than 300 units in revenue service and 700 more on order from the Toronto Transit Commission, San Francisco Municipal Railway, New York City Transit, and Metropolitan Transportation Authority Bus.<sup>204</sup> Their buses produce 90% less particulate matter, 40% less nitrogen oxide, and 30% fewer GHG.<sup>205</sup>

DaimlerChrysler also announced plans to start offering the Dodge Durango with a hybrid power train in 2003, and the company expects up to 15% of the total Durango volume will be equipped with the new gasoline-electric propulsion system.<sup>206</sup> The hybrid power train yields a 20% increase in fuel efficiency achieving 18.6 miles per gallon combined in city and on the highway compared to 15.5 miles per gallon for the conventional gasoline V-8 engine available in the Durango.<sup>207</sup> Despite this information, there currently are no signs on the website of production of this power train in the Dodge Durango's.<sup>208</sup> The apparent increase in fuel economy does not begin to match the increase in fuel economy by the hybrid SUVs currently produced by Ford which have a rating of thirty-six mpg in the city and

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<sup>200</sup> Jerry Garrett, *When Dream Cars are Powered by Pipe Dreams*, NY TIMES, Jan. 14, 2007, § 12, at 1.

<sup>201</sup> DaimlerChrysler, *DaimlerChrysler Receives Largest Hybrid Electric Bus Order to Date*, <http://www.daimlerchrysler.com/dccom> (last visited Jan. 4, 2007).

<sup>202</sup> *Id.*

<sup>203</sup> *Id.*

<sup>204</sup> *Id.*

<sup>205</sup> *Id.*

<sup>206</sup> DaimlerChrysler, *Durango to Get Patented Through-the-Road Hybrid Powertrain*, <http://www.daimlerchrysler.com/dccom> (last visited Jan. 4, 2007).

<sup>207</sup> *Id.*

<sup>208</sup> Dodge, *Durango*, <http://www.dodge.com/en/durango/index.html> (last visted May 18, 2007).



thirty-one mpg on the highway.<sup>209</sup> Like GM, DaimlerChrysler has taken the steps in mass transit improvements but is still behind in the public consumer market. With the 2006 auto show as the venue to introduce new technology, Daimler-Chrysler introduced new concept models of their previous cars but nothing indicating they plan on introducing or are developing hybrid vehicles for the public.

## B. Foreign Automakers

Because U.S. automakers have been slow in their development and implementation of hybrid vehicles, the foreign automakers have a head start and have already taken a foothold in the market for hybrid cars. However, foreign dominance extends far beyond just hybrid cars. Japanese automakers continue to develop and change their line-ups while their American counterparts have not.<sup>210</sup> Moreover, American automakers have to constantly fight public perception that foreign automakers produce the best autos.<sup>211</sup>

### 1. Toyota

The Toyota hybrid drive vehicles on the road now have saved over 258.2 million gallons of gas and the number increases by the minute.<sup>212</sup> Currently, Toyota has three hybrid cars in production: the Prius, the Highlander, and the Camry hybrid.<sup>213</sup>

In 2007, Toyota seems poised to pass GM in worldwide sales and become the world's largest automaker.<sup>214</sup> Toyota introduced the Tundra CrewMax, an oversize cab version of the Texas built pickup, hitting the strongest segment of the market still controlled by Detroit.<sup>215</sup> Furthermore, as the world's largest seller of gas electric hybrids, Toyota is predicting the company will sell 150,000 Prius hybrids in the United States in 2007.<sup>216</sup> The U.S. government fuel economy rating for the 2007 Prius is 60 mpg in

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<sup>209</sup> 2006 Escape Hybrid Specifications, <http://www.fordvehicles.com/suvs/escapehybrid/features/specs> (last visited Jan. 4, 2007).

<sup>210</sup> Daniel Griswold, *GM's Woes Homemade, Not Imported*, CATO INSTITUTE, CENTER FOR TRADE POLICY STUDIES, June 26, 2005, <http://www.freetrade.org/node/378>.

<sup>211</sup> CBS News, Poll: Americans Favor Japanese Autos, Jan. 8, 2007, [http://www.cbsnews.com/stories/2007/01/08/business/main2337102.shtml?source=search\\_story](http://www.cbsnews.com/stories/2007/01/08/business/main2337102.shtml?source=search_story) [hereinafter Poll: Americans Favor Japanese Autos].

<sup>212</sup> Toyota, Hybrid Synergy Drive, [http://www.toyota.com/vehicles/minisite/hsd/index.html?s\\_van=GM\\_HOME\\_HSD\\_MINISITE\\_IMG](http://www.toyota.com/vehicles/minisite/hsd/index.html?s_van=GM_HOME_HSD_MINISITE_IMG) (follow "Hybrid Synergy Drive" button)(last visited Apr. 12, 2007) [hereinafter Hybrid Synergy Drive].

<sup>213</sup> *Id.*

<sup>214</sup> Ulrich, *supra* note 1.

<sup>215</sup> *Id.*

<sup>216</sup> Ann Job, *Minimalist Toyota Sports Car is Hybrid*, Jan. 7, 2007, MSN, <http://autoshow.autos.msn.com/autoshow/detroit2007>.

the city and 51 mpg on the highway making it the most efficient car sold in America.<sup>217</sup> The Executive Vice President of Toyota Motor Sales USA, Inc. added that when hybrid model sales are combined for Toyota and Lexus, the automaker's hybrid sales could top 250,000 for the first time.<sup>218</sup> Though there are no plans for production yet, Toyota introduced the FT-HS, a 400-horsepower hybrid sports car meant to explore future designs for the automaker that will further solidify their hold on the hybrid market.<sup>219</sup>

In addition, Toyota apparently has a "global master plan" in which it plans to obtain 15% of the global car market by 2010.<sup>220</sup> This goal is in line with Toyota's desire to overtake GM as the world's largest car maker.<sup>221</sup> In 2003, Toyota surpassed Ford Motor as the world's second largest car maker and analysts believe it is on track to pass GM as well.<sup>222</sup>

## 2. Honda

Honda currently has three hybrid models available to the public: Accord Sedan, Civic Sedan, and the Honda Insight.<sup>223</sup> The Honda Insight was introduced in December 1999 and was the first hybrid car sold in the United States, as well as the most fuel efficient car in America for six years.<sup>224</sup> The Honda Civic Hybrid was introduced in 2002 and then in December 2004, with the introduction of the Accord Hybrid, Honda produced the world's first V-6 hybrid and the first hybrid vehicle that delivers both improved fuel economy and performance.<sup>225</sup> In 2006, Honda sold an all-time record number of hybrid vehicles; in September sales increased by 180.3% to 4351 units and year to date sales increased 79.4% to 35,552 units.<sup>226</sup> The Civic Hybrid also had its best sales in September 2006—1916 units, which is an increase of 24.8% over the previous year.<sup>227</sup> Also in September, the Accord Hybrid posted its best sales month in history with 2352 units.<sup>228</sup>

Honda led all automakers in consumer registration of hybrid vehicles

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<sup>217</sup> *Id.*

<sup>218</sup> *Id.*

<sup>219</sup> *Id.*

<sup>220</sup> Hans Greimel, *Report: Toyota Eyes 15% Global Market Share*, USA TODAY, Nov. 17, 2006, available at <http://www.usatoday.com/money/autos>.

<sup>221</sup> *Id.*

<sup>222</sup> *Id.*

<sup>223</sup> Honda, [www.automobiles.honda.com](http://www.automobiles.honda.com) (last visited Jan. 4, 2007).

<sup>224</sup> Honda, Three Honda Vehicles Receive Clean Fuel Deduction, <http://automobiles.honda.com/info/news> (last visited Jan. 4, 2007).

<sup>225</sup> *Id.*

<sup>226</sup> Honda, American Honda Reports Record September Sales, <http://automobiles.honda.com/info/news> (last visited Jan. 4, 2007).

<sup>227</sup> *Id.*

<sup>228</sup> *Id.*

in 2003 with 23,048 Civic and Insight hybrid vehicle registrations combined; the Civic Hybrid alone accounted for half of all hybrid vehicles registered in 2003.<sup>229</sup> According to R.L. Polk data, the national hybrid vehicle registration rose 25.8% in 2003 while Honda Civic registrations doubled.<sup>230</sup> The Civic Hybrid earned an EPA city/highway rating of 48/47 mpg with the manual transmission receiving a higher rating of 46/51 mpg; both models have a range of over 600 miles.<sup>231</sup> The Honda Insight has an EPA rating of 60/66 mpg and has earned the highest EPA fuel economy rating for passenger cars for five consecutive years.<sup>232</sup>

Honda has now introduced a FCX Concept car that is powered by fuel cells. The FCX Concept is a precursor to the production car that will be coming in 2008.<sup>233</sup> The vehicle drives clean, emitting nothing but water vapor.<sup>234</sup> The energy source for the automobile will be hydrogen—a clean, domestic fuel that will significantly reduce emissions of carbon dioxide.<sup>235</sup> The FCX Concept includes a well equipped full size cabin with many of the latest amenities.<sup>236</sup>

Overall, Honda dominates the hybrid car market and Toyota is highly profitable as well. However as the market grows, the chance for American automakers to make their mark will become greater unless they continue to produce less efficient systems. American automakers have the same technology available to produce these vehicles and are in the process of doing so. The problem with the technologies American automakers are introducing is the inconvenience of having to plug in your car to recharge it when foreign manufacturers are selling a car that charges itself.

What is difficult to understand is if the market is moving towards offering more fuel efficient vehicles, why are American automakers still against Kyoto? Foreign automakers continue to gain market share in the United States due to appealing designs, price, and quality of their vehicles.<sup>237</sup> American automakers have failed to do this and therefore have had trouble increasing and defending their market share.<sup>238</sup> As much as automakers have tried to win back car buyers looking for fuel efficient

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<sup>229</sup> 2005 Honda Civic Delivers Fuel Economy, Near Zero Emissions, <http://automobiles.honda.com/info/news> (last visited Jan. 4, 2007).

<sup>230</sup> *Id.*

<sup>231</sup> *Id.*

<sup>232</sup> *Id.*

<sup>233</sup> Perry Stern, *Functionality & Fun From Honda*, MSN, <http://autos.msn.com/as/minishow/article.aspx?contentID=4024442&s=LAAutoshow2006> (last visited May 18, 2007).

<sup>234</sup> *Id.*

<sup>235</sup> *Id.*

<sup>236</sup> *Id.*

<sup>237</sup> Poll: Americans Favor Japanese Autos, *supra* note 211.

<sup>238</sup> *Id.*

vehicles, they have had little success.<sup>239</sup> The current government list for most fuel efficient cars is dominated by Toyota and Honda, who account for seven of the twelve vehicles (including some ties) in the top ten; American automakers only accounted for three vehicles, all hybrids.<sup>240</sup> If the government requires emissions cuts, it will also have to provide some assistance in making the cuts, because the industry-wide changes will be an extensive undertaking that, if unsuccessful, would prevent the United States from meeting the emissions goal in Kyoto. This would give American auto makers a foundation to expand the development of better technologies and have them reach the consumers. The involvement of both the government and the auto industry would be crucial in the success of achieving the standards set forth in Kyoto as well as keeping the struggling auto industry from folding.

## VII. CONCLUSION

While it is clear that there are means available to American automakers to make an impact on lowering emissions, it is not as clear why they continue to oppose the Kyoto Protocol. Not only is the market moving in the direction of more fuel efficient cars, the big three automakers in this country have all acknowledged their wrongs and admit their coalition was preventing them from being more environmentally friendly. With the market moving towards more emission conscious cars, lobbying for support of Kyoto would only help U.S. automakers make further advancements in the market. Though foreign automakers are prominent in the hybrid market, there is still room and time for American automakers to become involved and be profitable as well. Consumer choice will still be just as important. Some American consumers prefer to buy American made cars. Giving consumers the opportunity to purchase affordably priced hybrid vehicles or even just more fuel efficient vehicles from more than three manufacturers can only prove beneficial to American automakers.

American automakers have already put the technology into use for mass transit systems, but to make an even bigger impact they need to translate their success into the mainstream automobile market. Foreign manufacturers accepted responsibility for their part of the emissions problem; it is time for American automakers to do the same. The market is beginning to correct itself, but so far, foreign automakers are reaping the benefits. By creating broader lineups that appeal to consumers, American automakers would be better able to compete with foreign automakers.

The automotive industry has extensive lobbying power and has used it to its advantage to oppose the Kyoto Protocol. It should use that same

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<sup>239</sup> *Id.*

<sup>240</sup> *Toyota, Honda Dominate, supra* note 109.

lobbying power to increase its presence in the hybrid and fuel-efficient automobile market. Steps must be taken for domestic automakers to regain their market prominence. Their lobbying power is a great advantage, and can triumph over the government's illogical reasoning for not implementing Kyoto. Instead of stressing the emissions issue, the American automakers should focus on how much this could help the American auto industry. With the three biggest automakers in America all posting losses in 2006, it is time for change. Though the industry does not want to be bailed out, this is the best alternative, and Kyoto is the ideal way to be stabilized by the government because both parties would be responsible for the emissions standards being met.

The market is changing. Now it's time for American automakers to capitalize on those changes. Automakers in this country need to take advantage of their power for their own stability and the well-being of Americans as a whole. Ratification of Kyoto would only further the push for more fuel efficient vehicles, which in turn will affect the market. American automakers are losing the race to develop the best fuel-efficient technology available and deliver these vehicles to consumers in America.<sup>241</sup> American consumers want these cars and other vehicles that would lessen our countries dependency on foreign oil, and decrease global-warming pollution.<sup>242</sup> The Europeans, Japanese, and Chinese already committed to far more aggressive MPG standards than the United States.<sup>243</sup> With Kyoto already ratified by other countries, and the continuing technological advances that foreign automakers are making, American automakers need to increase their support for this international legislation before they are unable to successfully enter a continuously progressing market.

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<sup>241</sup> *Id.*

<sup>242</sup> *Id.*

<sup>243</sup> *Id.*